

# APPENDIX I

## GLOSSARY

**ALLOWANCE PARTS LIST (APL)**—Repair parts required for unit having the equipment/ component listed.

**ALLOWANCE EQUIPAGE LIST (AEL)**—Equipment requirements for a unit having the exact equipment/component listed.

**BEAM-LEAD CHIP**—Semiconductor chip with electrodes (leads) extended beyond the wafer.

**BONDING WIRES**—Fine wires connecting the bonding pads of the chip to the external leads of the package.

**BUILT-IN TEST EQUIPMENT (BITE)**—Permanently mounted to the equipment for the purpose of testing the equipment.

**CABLE HARNESS**—A group of wires or ribbons of wiring used to interconnect electronic systems and subsystems.

**CATHODE SPUTTERING**—Process of producing thin film components.

**CERMET**—A combination of powdered precious-metal alloys and an inorganic material such as alumina. Used in manufacturing resistors, capacitors, and other components for high-temperature applications.

**CORDWOOD MODULE.**—A method of increasing the number of discrete components in a given space. Resembles wood stacked for a fireplace.

**CRYSTAL FURNACE.**—Device for artificially growing cylindrical crystals for producing semiconductor substrates.

**DEPOT-LEVEL MAINTENANCE (SM&R Code D)**—Supports S&R Code I and SM&R Code O activities through extensive shop facilities and equipment and more highly skilled personnel.

**DICE**—Uncased chips.

**DIE BONDING**—Process of mounting a chip to a package.

**DIFFUSION**—Controlled application of impurity atoms to a semiconductor substrate.

**DISCRETE COMPONENTS**—Individual transistors, diodes, resistors, capacitors, and inductors.

**DOPING**—See Diffusion.

**DUAL IN-LINE PACKAGE (DIP)**—IC package having two parallel rows of preformed leads.

**ENCAPSULATED**—Imbedded in solid material or enclosed in glass or metal.

**EPITAXIAL PROCESS**—The depositing of a thin uniformly doped crystalline region (layer) on a substrate.

**EUTECTIC ALLOY**—An alloy that changes directly from a solid to a liquid with no plastic or semiliquid state.

**EUTECTIC SOLDER**—An alloy of 63 percent tin and 37 percent lead. Melts at 361° F.

**FILM ICs**—Conductive or nonconductive material deposited on a glass or ceramic substrate. Used for passive circuit components, resistors, and capacitors.

**FLAT PACK**—IC package.

**FLIP CHIP**—Monolithic IC packaging technique that eliminates need for bonding wires.

**FLUX**—Removes surface oxides from metals being soldered.

**GENERAL PURPOSE ELECTRONIC TEST EQUIPMENT (GPETE)**—Multimeters, oscilloscopes, voltmeters, signal generators, etc.

**GROUND PLANES**—Copper planes-used to minimize interference between circuits and from external sources.

**HYBRID ICs**—Two or more integrated circuit types, or one or more integrated circuit types and discrete components on a single substrate.

**INTEGRATED CIRCUIT (IC)**—Elements inseparably associated and formed on or within a single substrate.

**INTERMEDIATE-LEVEL MAINTENANCE (SR&R Code I)**—Direct support and technical assistance to user organizations. Tenders and shore-based repair facilities.

**ISOLATION**—The prevention of unwanted interaction or leakage between components.

**LANDS**—Conductors or runs on pcbs.

**LARGE SCALE INTEGRATION (lsi)**—An integrated circuit containing 1,000 to 2,000 logic gates or up to 64,000 bits of memory.

**MASK**—A device used to deposit materials on a substrate in the desired pattern.

**MICROCIRCUIT**—A small circuit having high equivalent-circuit-element density, which is considered as a single part composed of interconnected elements on or within a single substrate to perform an electronic-circuit function.

**MICROELECTRONICS**—That area of electronics technology associated with electronic systems built of extremely small electronic parts or elements.

**MICROCIRCUIT MODULE**—An assembly of microcircuits or a combination of microcircuits and discrete components that perform one or more distinct functions.

**MODIFIED TRANSISTOR OUTLINE (TO)**—IC package resembling a transistor.

**MODULAR PACKAGING**—Circuit assemblies or subassemblies packaged to be easily removed for maintenance or repair.

**MODULE**—A circuit or portion of a circuit packaged as a removable unit. A separable unit in a packaging scheme displaying regularity of dimensions.

**MILITARY STANDARDS (MILSTD)**—Standards of performance for components or equipment that must be met to be acceptable for military systems.

**MINIATURE ELECTRONICS**—Modules, packages, pcbs, and so forth, composed exclusively of discrete components.

**2M**—Miniature/Microminiature repair program.

**MONOLITHIC IC**—ICs that are formed completely within a semiconductor substrate. Silicon chips.

**OFF-LINE TEST EQUIPMENT**—Tests and isolates faults in modules or assemblies removed from systems.

**OHMS PER SQUARE**—The resistance of any square area of thin film resistive material as measured between two parallel sides.

**ON-LINE TEST EQUIPMENT**—Continuously monitors the performance of electronic systems.

**ORGANIZATIONAL-LEVEL MAINTENANCE (SM&R Code O)**—Responsibility of the user organization.

**PACKAGING LEVELS**—System developed to assist maintenance personnel in isolating faults.

**PHOTO ETCHING**—Chemical process of removing unwanted material in producing printed circuit boards.

**POINT-TO-POINT WIRING**—Individual wires run from terminal to terminal to complete a circuit.

**PRINTED CIRCUIT BOARD (pcb)**—The general term for completely processed printed circuit or printed wiring configurations. It includes single-layered, double-layered, and multi-layered boards.

**SCREENING**—Process of applying nonconductive or semiconductive materials to a substrate to form thick film components.

**SHIELDING**—Technique designed to minimize internal and external interference.

**SOURCE, MAINTENANCE, AND RECOVER-ABILITY CODES (SM&R CODES)**—Specify maintenance level for repair of components or assemblies.

**SUBSTRATE**—Mounting surface for integrated circuits. May be semiconductor or insulator material depending on type of IC.

**THICK FILM COMPONENTS**—Passive circuit components (resistors and capacitors) having a thickness of 0.001 centimeter.

**THIN FILM COMPONENTS**—Passive circuit elements (resistors and capacitors) deposited on a substrate to a thickness of 0.0001 centimeter.

**VACUUM EVAPORATION**—Process of producing thin film components.

**VERY LARGE SCALE INTEGRATION (vlsi)**—An integrated circuit containing over 2,000 logic gates or 64,000 bits of memory.

**WAFER**—A slice of semiconductor material upon which monolithic ICs are produced.

## **APPENDIX II**

# **REFERENCE LIST**

### **CHAPTER ONE**

*Linear Integrated Circuits*, Basic Electricity and Electronics Course, Module 34, CANTRAC A-100-0010, Naval Education and Training Program Development Center Detachment, Great Lakes, III., 1981.

*Technical Manual, Miniature/Microminiature (2M) Electronic Repair Program*, Vols. I, II, and III, NAVSEA TE000-AA-HBK-010/020/030/2M, Naval Sea Systems Command, Keyport, Wash., 1982.

### **CHAPTER 2**

*Technical Manual, Miniature/Microminiature (2M) Electronic Repair Program*, Vols. I, II, and III, NAVSEA TE000-AA-HBK-010/020/030/2M, Naval Sea Systems Command, Keyport, Wash., 1982.

### **CHAPTER 3**

*General Maintenance Handbook*, Electronics Installation and Maintenance Books, NAVSEA SE000-00-EIM-160, Naval Sea Systems Command, Washington, D.C., 1981.

*Technical Manual, Miniature/Microminiature (2M) Electronic Repair Program*, Vols. I, II, and III, NAVSEA TE000-AA-HBK-010/020/030/2M, Naval Sea Systems Command, Keyport, Wash., 1982.



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